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ABSTRACT

This book explores current theory, research, practice, and policy in the assessment of higher order thinking in mathematics, focusing on the elementary and secondary grades. Current knowledge and research on mathematics learning and testing is synthesized. Examples of innovative test items for classroom use and state assessment programs are provided. Information on new assessment technologies, including computer-based approaches is presented. Addressed are the following issues: (1) assessment objectives and the criteria used to construct tests; (2) identification of the parameters that characterize mathematical thinking processes; (3) the distinction between pure and applied mathematics; (4) the integration of mathematics and other disciplines; and (5) determination of the mathematical background of the students for whom an item or test is appropriate. The need for reform is related to five assumptions: (1) the society has moved from an industrial to an informational base; (2) the emphasis in education must shift to communication and reasoning skills; (3) the kinds of activities traditionally associated with higher level thinking are not limited to advanced levels of development; (4) all students can learn higher level thinking skills; and (5) that achievement testing is a conservative inhibitor to needed reform. (KR)

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